查询APR3101-17BI-TR供应商

MicroPower Microprocessor Reset Circuit with Manual Reset

Features

- 1.2V to 6V Input Voltage Range
- Low Quiescent Current : less Than 1.5 µA
- High accuracy detection threshold : ±1.5%
- Fixed trimmed reset thresholds for 1.5V, 1.75V, 2.32V, 2.63V, 2.93V, 3.08V, 3.9V, 4.38V.
- Manual Reset Input
- Reset Timeout Period 250ms
- Available output configurations
  - Open-drain output
  - CMOS active high output
  - CMOS active low output
- SOT-23-5 package
- No external components

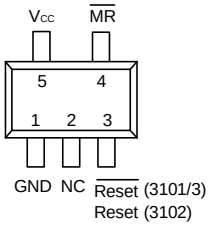
Applications

- Computers
- Cell Phones
- Portable Electronics
- µP Power Supply Monitoring

General Description

The APR3101/2/3 are designed to monitor voltage supplies in µP and digital systems. The quiescent current is extremely low, typically 1.5 µA, making it ideal for portable battery operated equipment. The APR3101/2/3 operate by monitoring the system power supply voltage. When the input voltage drops below a fixed threshold or whenever manual reset is asserted, the device asserts a reset signal for a fixed time period after Vcc rises above the fixed threshold or manual reset is deasserted. The APR3101/2/3 series is available with three output stage versions:APR3101 push-pull active low output, APR3102 push-pull active high output and APR3103 open drain active low output. The APR3101/2/3 also have a debounced manual reset input that is provided to override the reset monitor. They are also designed to reject fast line transient glitches on Vcc. The APR3101/2/3 are come in a miniature SOT-23-5 package.

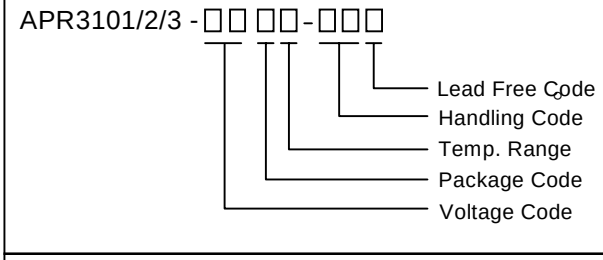
Pin Configuration



SOT-23-5 (Top View)

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Ordering and Marking Information



Package Code
B : SOT-23-5
Temp. Range
I : -40 to 85°C
Handling Code
TR : Tape & Reel
Voltage Code :
15 : 1.5V ~ 50 : 5.0V
Lead Free Code
L : Lead Free Device Blank : Original Device

APR3101/2/3 B : A1/2/3 X X
Date Code
Voltage Code A:1.5V B:1.75V C:2.32V D:2.63V E:2.93V F:3.08V G:3.9V H:4.38V

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	V_{CC} to GND	-0.3 to 6	V
V_{RESET}	RESET to GND (Push-Pull Output)	-0.3 to V_{CC} +0.3	V
	$\overline{RESET}$ to GND (Open Drain Output)	-0.3 to 6	
I_{CC}, I_{MR}	Maximum Continuous Input Current	20	mA
I_{RESET}	RESET/$\overline{RESET}$ Current	20	mA
dVcc/dt	Rate of Rise of V_{CC}	100	V/µs
T_J	Junction Temperature Range	-40 to 150	°C
T_L	Lead Temperature (Soldering, 10 second)	260	°C
$R_{TH,JA}$	Thermal Resistance – Junction to Ambient	357	°C/W
P_D	Power Dissipation	Internally Limited	W
TSTG	Storage Temperature Range	-65 to +150	°C

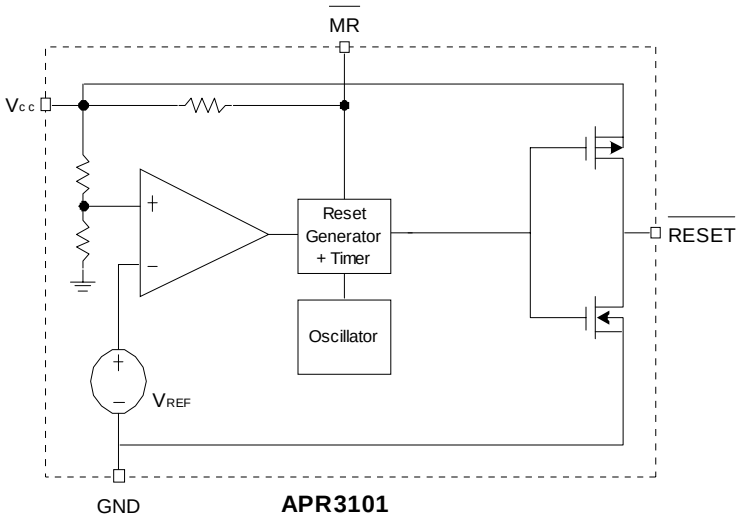
Pin Function Descrpition

PIN		Description
No.	Name	
1	GND	Ground connection
2	NC	No internal connection
3	$\overline{RESET}$ (APR3101/3)	$\overline{RESET}$ output remains low while Vcc is below the reset threshold and remains so for a fixed time period after Vcc raises above the reset threshold.
	RESET (APR3102)	RESET output remains high while Vcc is below the reset threshold and remains so for a fixed time period after Vcc raises above the reset threshold.
4	$\overline{MR}$	Manual Reset active low input. A logic low signal on $\overline{MR}$ asserts a reset condition. Asserted reset continues as long as MR is low and for a fixed time period after $\overline{MR}$ returns high.
5	Vcc	Supply Voltage (+1.2V to +6V)

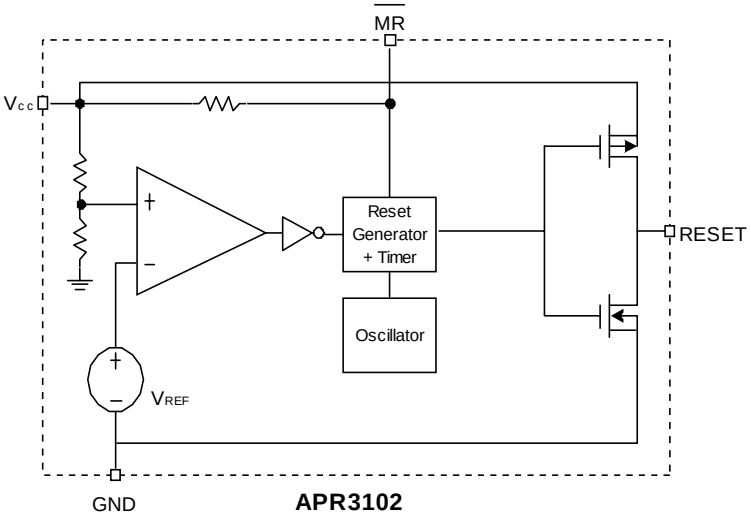
Note: The pin sequence here might not be correct for all different package types, and please refer pin configuration in page1 for correct pin assignment.

Copyright © ANPEC Electronics Corp.

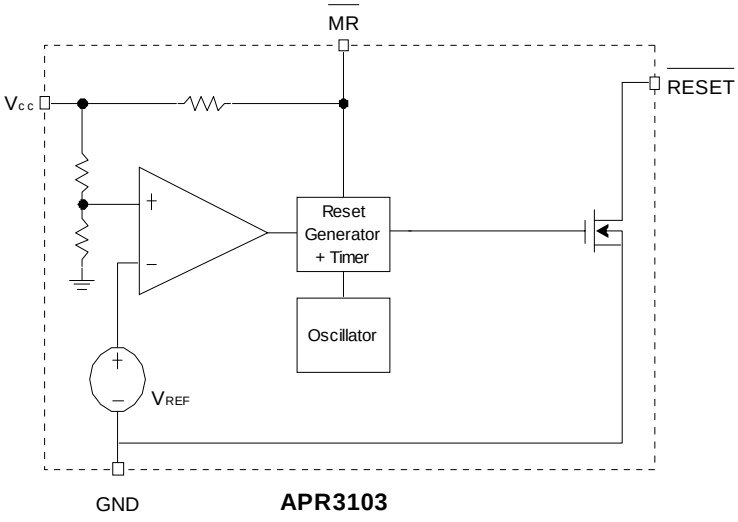
Block Diagram



APR3101



APR3102



APR3103

Copyright © ANPEC Electronics Corp.

Part Number Description

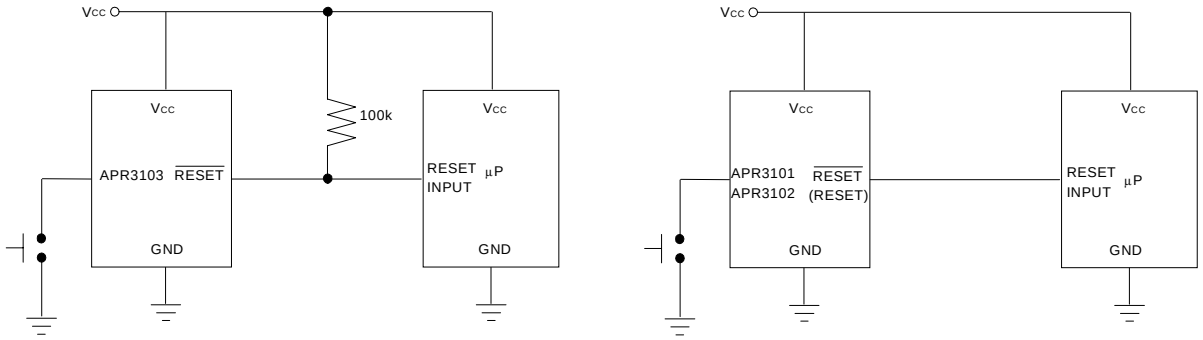
Part Number	Part Description
APR3101	Reset Output Push Pull Active Low with Delay
APR3102	Reset Output Push Pull Active High with Delay
APR3103	Reset Output Open Drain Active Low with Delay

Electrical Characteristics

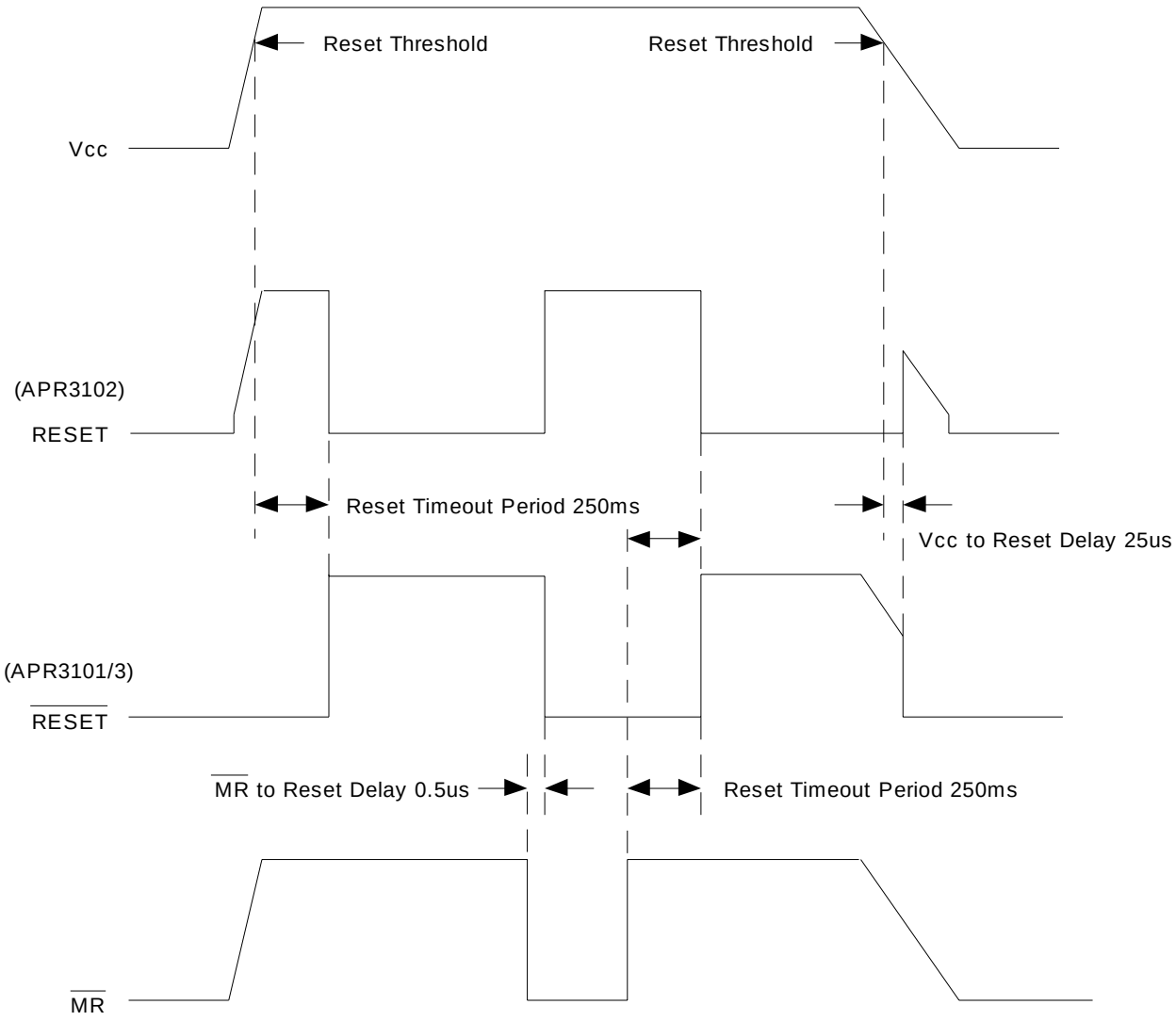
V_{IN} = 5V, T_A = -40 to 85°C unless otherwise noted. Typical values are at T_A=25°C, V_{CC} = 5V for 4.38V versions, V_{CC} = 3.3V for 3.08/2.93V versions, V_{CC} = 3.0V for 2.63V. versions and V_{CC} = 2.5V for 2.32V versions, V_{CC} = 2.0V for 1.75V versions , V_{CC} = 1.8V for 1.5V versions.

Symbol	Parameter	Test Conditions	APR3101/2/3			Unit
			Min.	Typ.	Max.	
V_{CC}	Supply Voltage		1.2		6	V
I_{CC}	Supply Current	V_{CC}=1.5V~6V		1.5	4	µA
		T_A=-40 to 85°C		3	5	
V_{TH}	Reset Threshold	T_A=25°C		±1.5%		
		T_A=-40 to 85°C		±2%		
V_{HYST}	Hysteresis Range			20		mV
T_{RTP}	Reset Timeout Period		150	250	350	ms
V_{OL}	Reset Output Low	I_{SINK}=1.2mA			0.5	V
V_{OH}	Reset Output High	I_{SOURCE}=0.6mA	0.8*V_{CC}			
T_D	V_{CC} to Reset Delay	V_{CC}=V_{TH} to (V_{TH}-100mV)		25		µS
I_{LE}	Reset Output Leakage				0.5	µA
T_{MPW}	$\overline{MR}$ Minimum Pulse Width		10			µS
T_{MRD}	$\overline{MR}$ to Reset Delay			0.5		µS
V_{MIL}	$\overline{MR}$ Input Low Threshold				0.4* V_{CC}	V
V_{MIH}	$\overline{MR}$ Input High Threshold		0.5* V_{CC}			
R_{MR}	$\overline{MR}$ Pull-Up resistance		30	47	70	KΩ

Application Circuit

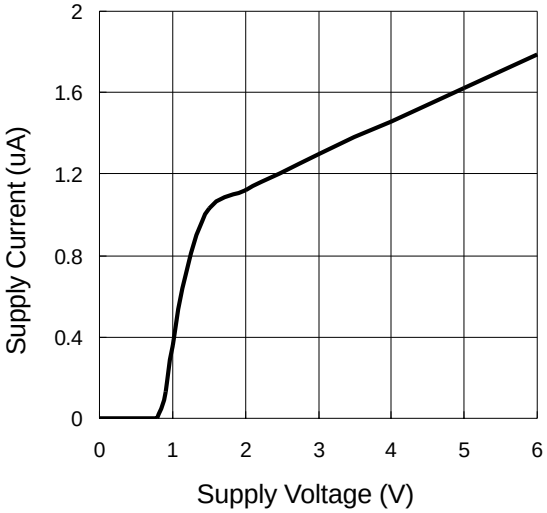


Timing Chart

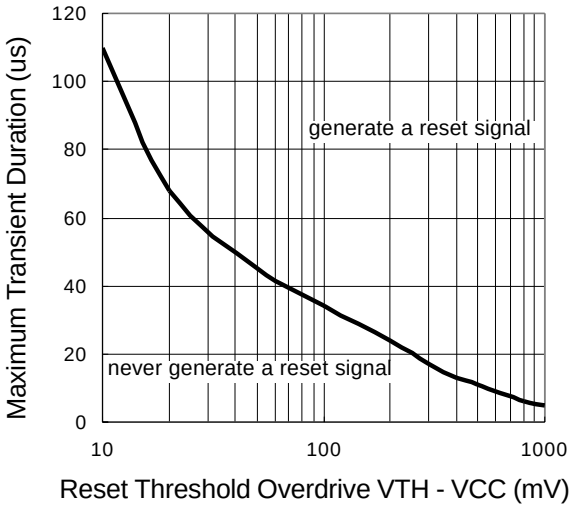


Typical Characteristics

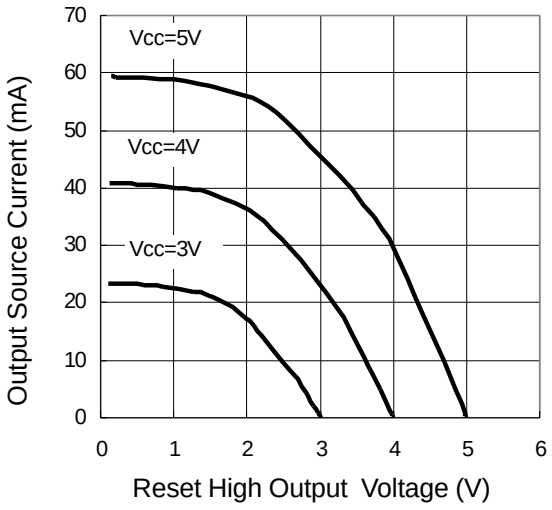
Supply Current vs. Supply Voltage



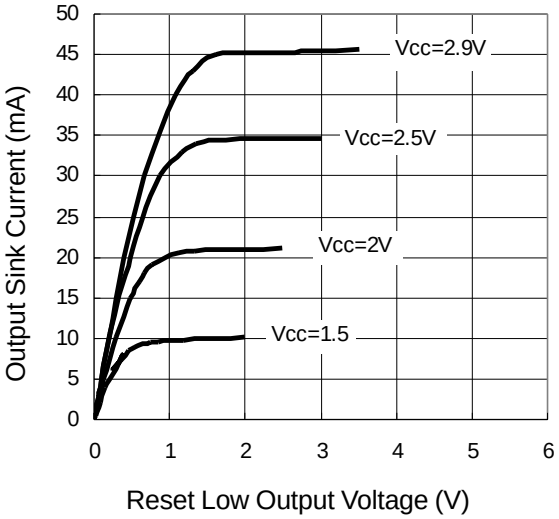
Maximum Transient Duration vs.
Reset Threshold Overdrive VTH - VCC



Output Source Current vs. Reset High Output Voltage

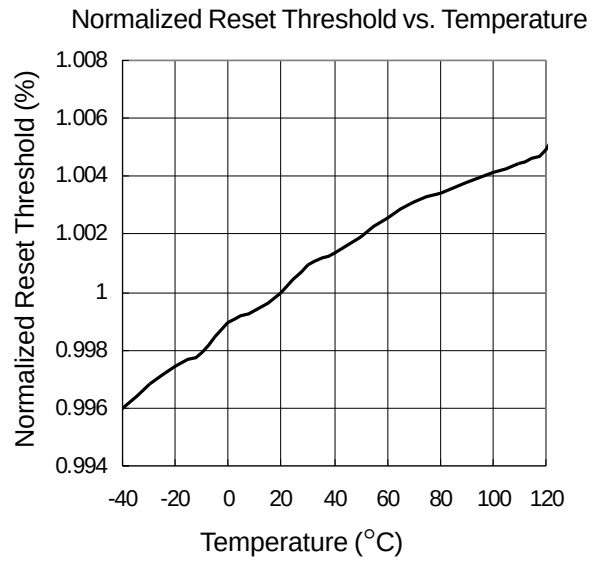


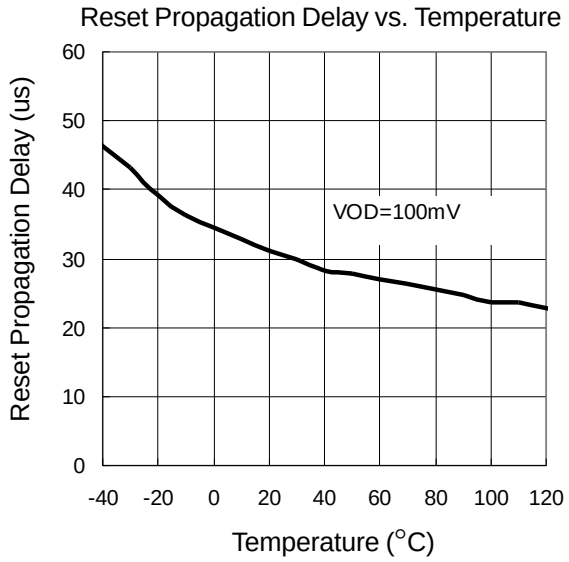
Output Sink Current vs. Reset Low Output Voltage

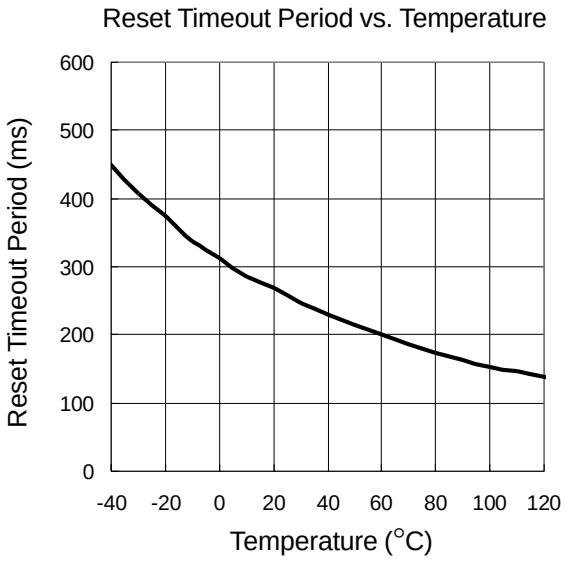


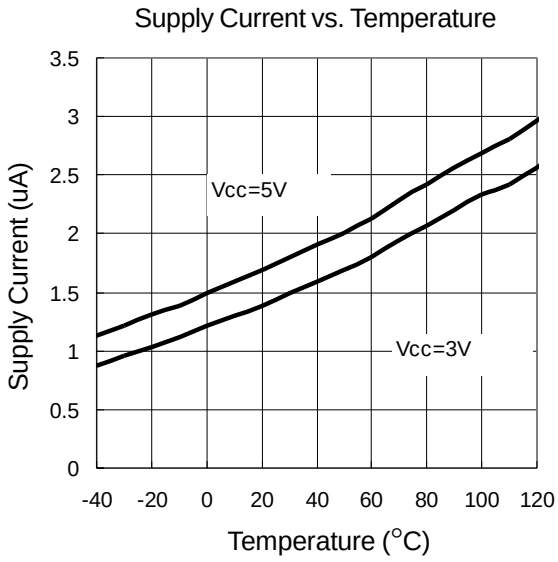
Copyright © ANPEC Electronics Corp.

Typical Characteristics





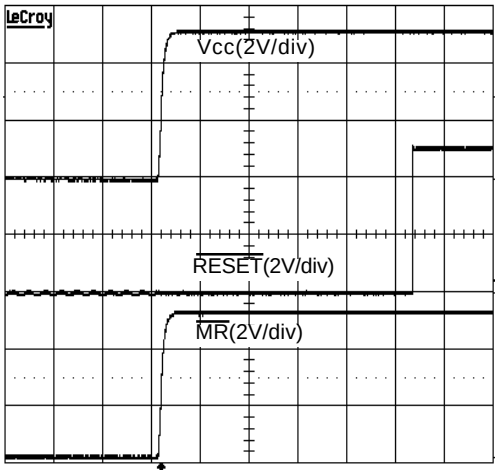




Copyright © ANPEC Electronics Corp.

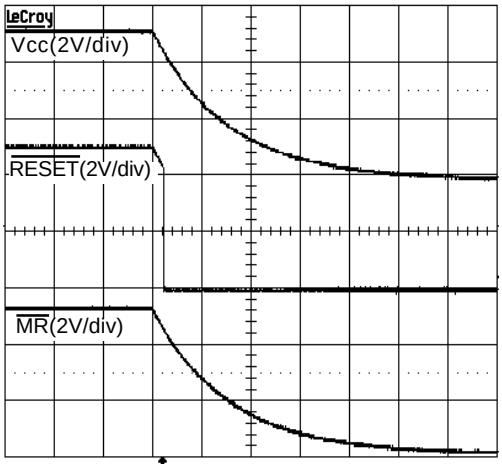
Typical Characteristics

Power Up



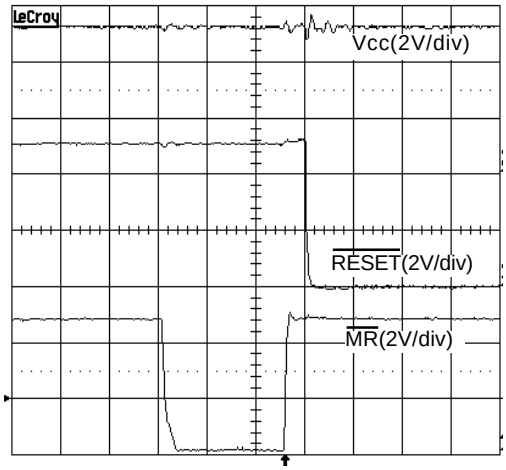
Time (50ms/div)

Power Down



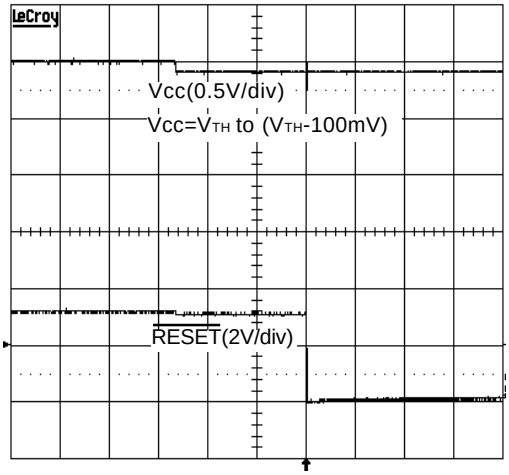
Time (500ms/div)

$\overline{MR}$ to Reset Delay



Time (0.2us/div)

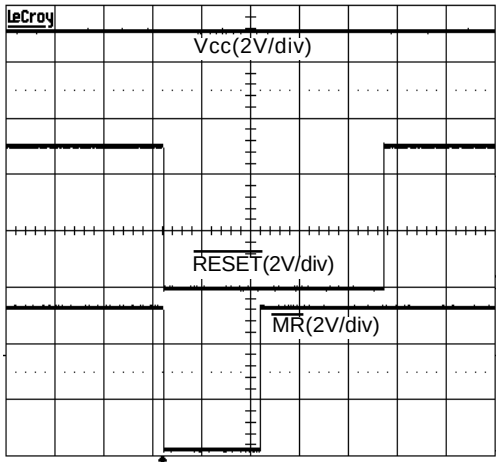
Vcc to RESET Delay



Time (10us/div)

Typical Characteristics

Manual Reset



Time (100ms/div)

Application Information

Vcc Transient Rejection

The APR3101/2/3 have the function to reject the transient glitches from the power line. The Maximum Transient Duration vs. Reset Threshold Overdrive shows at Typical Characteristics. The transient voltage with the duration under the curve will not generate a reset signal, e.g. a transient of 100mV below the reset threshold voltage have the duration more than 35us, it will generate a reset signal. Connect a 0.1uF bypass capacitor to the Vcc pin can improve the transient immunity.

Manual Reset Input

Force the $\overline{MR}$ low asserts the reset signal, asserted reset continues as long as $\overline{MR}$ is low and after the $\overline{MR}$ goes high the reset signal is maintained for a fixed timeout period. The $\overline{MR}$ is internally connected a 47kΩ resistor to Vcc, so it can be floating if $\overline{MR}$ is not used. The $\overline{MR}$ input also has a debounce time 500ns to avoid the glitches. It allows use of a mechanical switch or a TTL, and CMOS logic signal.

Reset Output

The APR3101/2/3 have 3 output stage versions: APR3101 is an active low push-pull output,when the Vcc drops below the reset threshold or $\overline{MR}$ goes low, the $\overline{RESET}$ output generates a low signal. APR3102 is an active high push-pull output, when the Vcc drops below the reset threshold or $\overline{MR}$ goes low; the RESET output generates a high signal (see Timing Chart). APR3103 is an active low open drain output, the $\overline{RESET}$ output must be connected a pull-up resistor to a supply voltage that is lower than 6V, it suits to use in multiple voltage systems (see Figure 2). The APR3101 $\overline{RESET}$ output is valid until the Vcc=1.2V, below 1.2V the IC is shutdown, and the output becomes a floating state. If it is a trouble, a resistor should be connected from reset output to ground to keep the reset output low (see Figure 1). For The APR3102, a pull-up resistor to Vcc is required to keep the valid reset output for Vcc below 1.2V.

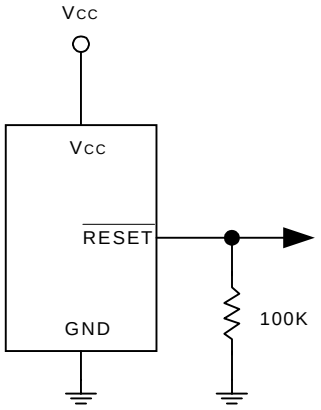


Figure 1. Ensuring $\overline{RESET}$ Valid to Vcc = 0 V

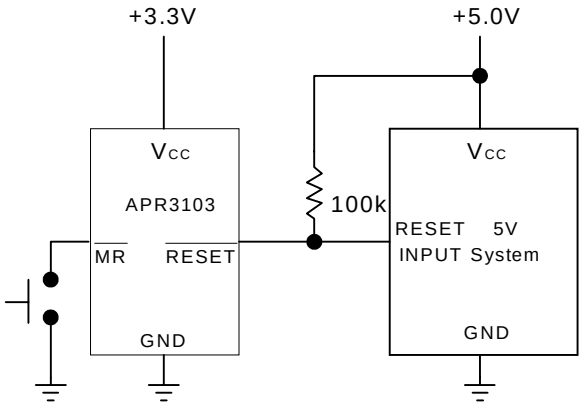
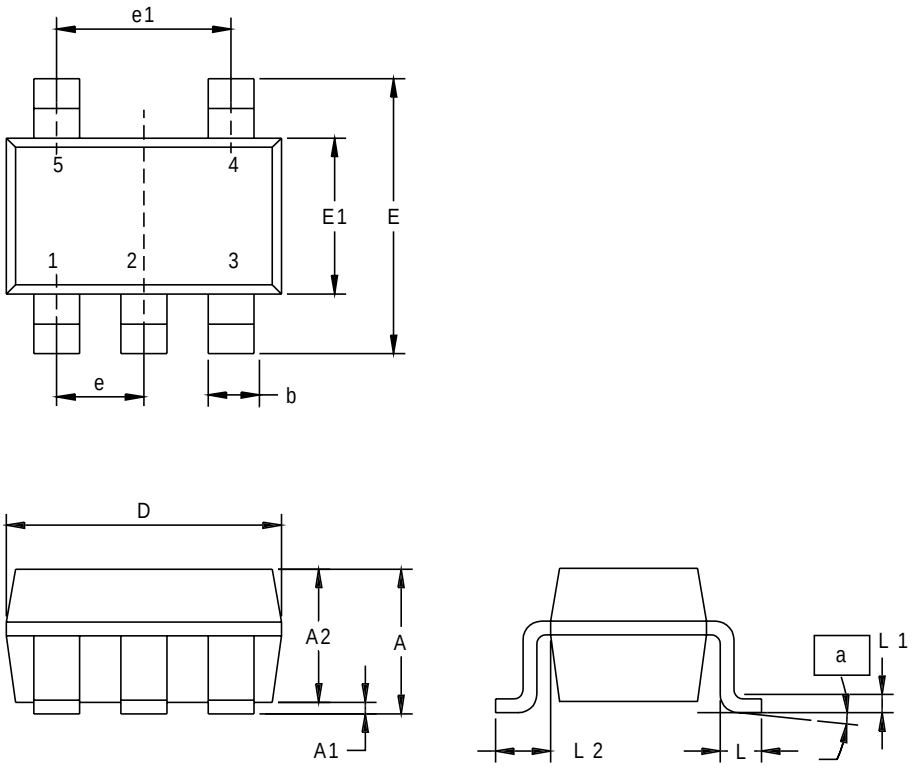


Figure 2. APR3103 Open Drain Output with Multiple Supplies

Packaging Information

SOT-23-5



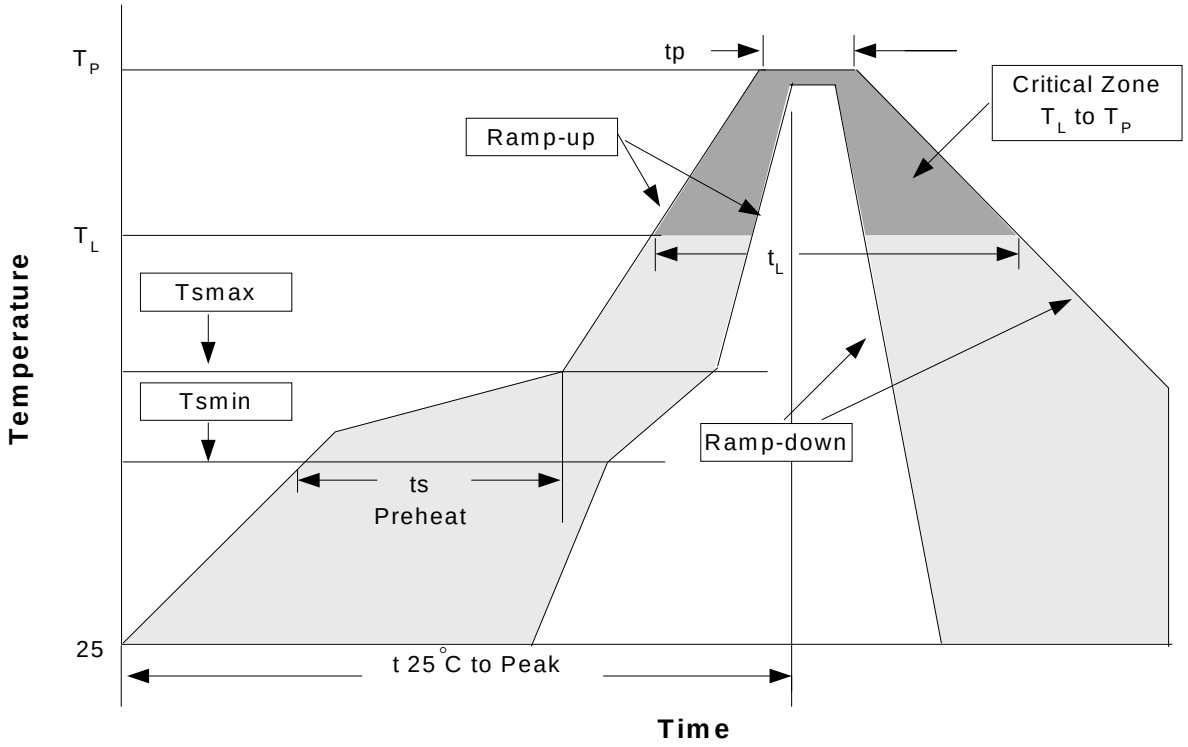
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.95	1.45	0.037	0.057
A1	0.05	0.15	0.002	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.011	0.019
D	2.8	3.00	0.110	0.118
E	2.6	3.00	0.102	0.118
E1	1.5	1.70	0.059	0.067
e	0.95BSC		0.037BSC	
e1	1.90BSC		0.074BSC	
L	0.35	0.55	0.014	0.022
L1	0.20 BSC		0.008 BSC	
L2	0.5	0.7	0.020	0.028
N	5		5	
α	0°	10°	0°	10°

Copyright © ANPEC Electronics Corp.

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb), 100%Sn
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)



Classificatin Reflow Profiles

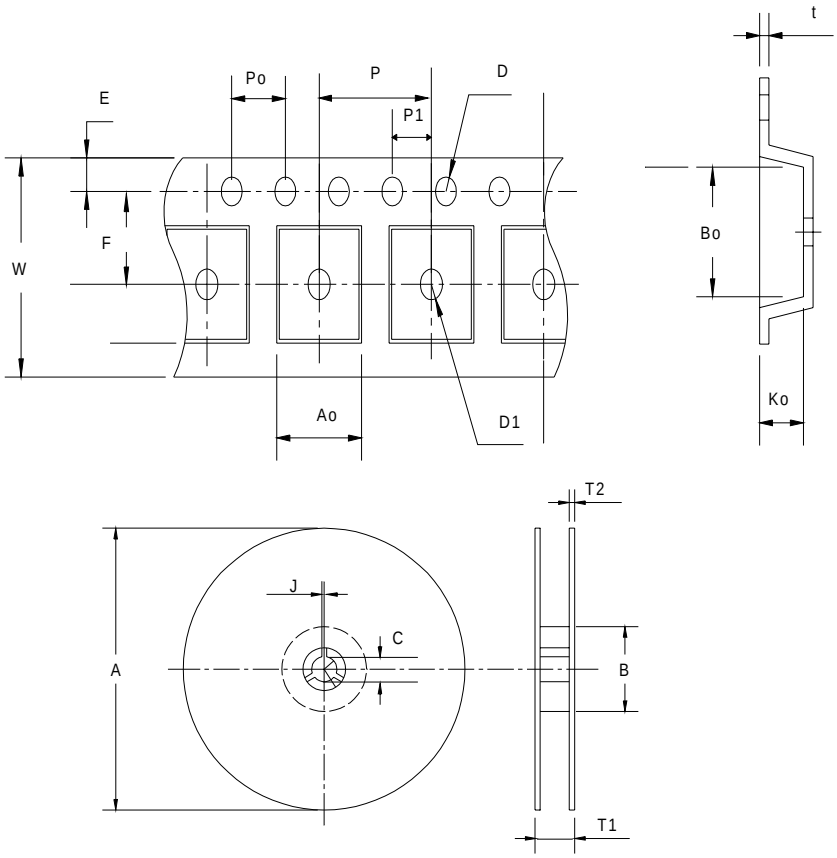
Profile Feature	Sn-Pb Eutectic Assembly		Pb-Free Assembly	
	Large Body	Small Body	Large Body	Small Body
Average ramp-up rate (T_L to T_P)	3°C/second max.		3°C/second max.	
Preheat - Temperature Min (Tsmin) - Temperature Mix (Tsmax) - Time (min to max)(ts)	100°C 150°C 60-120 seconds		150°C 200°C 60-180 seconds	
Tsmax to T_L - Temperature(T_L) - Time (t_L)			3°C/second max	
Peak Temperature(Tp)	183°C 60-150 seconds		217°C 60-150 seconds	
Time within 5°C of actual Peak Temperature(tp)	225 +0/-5°C	240 +0/-5°C	245 +0/-5°C	250 +0/-5°C
Ramp-down Rate	10-30 seconds	10-30 seconds	10-30 seconds	20-40 seconds
Time 25°C to Peak Temperature	6°C/second max.		6°C/second max.	
	6 minutes max.		8 minutes max.	

Note: All temperatures refer to topside of the package. Measured on the body surface.

Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C , 5 SEC
HOLT	MIL-STD-883D-1005.7	1000 Hrs Bias @ 125 °C
PCT	JESD-22-B, A102	168 Hrs, 100 % RH , 121°C
TST	MIL-STD-883D-1011.9	-65°C ~ 150°C, 200 Cycles
ESD	MIL-STD-883D-3015.7	VHBM > 2KV, VMM > 200V
Latch-Up	JESD 78	10ms , I_{tr} > 100mA

Carrier Tape



Application	A	B	C	J	T1	T2	W	P	E
SOT-23-5	178±1	72 ± 1.0	13.0 + 0.2	2.5 ± 0.15	8.4 ± 2	1.5± 0.3	8.0+ 0.3 - 0.3	4 ± 0.1	1.75± 0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	3.5 ± 0.05	1.5 +0.1	1.5 +0.1	4.0 ± 0.1	2.0 ± 0.1	3.15 ± 0.1	3.2± 0.1	1.4± 0.1	0.2±0.03

(mm)

Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOT- 23	8	5.3	3000

Customer Service

Anpec Electronics Corp.
Head Office :
5F, No. 2 Li-Hsin Road, SBIP,
Hsin-Chu, Taiwan, R.O.C.
Tel : 886-3-5642000
Fax : 886-3-5642050

Taipei Branch :
7F, No. 137, Lane 235, Pac Chiao Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R. O. C.
Tel : 886-2-89191368
Fax : 886-2-89191369